

Appl. No. 09/994,199

Amd. Dated January 17, 2005

Reply to Office Action Dated September 17, 2004

Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application.

Listing of Claims:

Please amend the claims as follows without prejudice. No new matter has been added by way of these amendments.

1. (Currently Amended) A method of identifying the presence of hydrogen sulfide in a wellbore penetrating a subterranean formation, comprising:
lowering a formation evaluation tool comprising at least one sample of material operatively connected thereto into the wellbore such that the material is exposed to fluid in the wellbore, the at least one sample of material ~~exposed~~ being optically reactive to the presence of hydrogen sulfide; and
determining whether an optical reaction has occurred to the at least one sample of material.
2. (Previously Presented) The method of claim 1, further comprising:
inspecting the at least one sample of material at the surface for an optical reaction.
3. (Previously Presented) The method of claim 1, further comprising:
inspecting the optical reaction of the at least one sample of material to estimate the quantity of hydrogen sulfide contained in the fluid.
4. (Previously Presented) The method of claim 1, further comprising: retrieving the tool from the wellbore.
5. (Original) The method of claim 1, further comprising:
taking temperature readings of the reservoir fluid.

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6. (Previously Presented) The method of claim 1, further comprising:
taking temperature readings of the reservoir fluid;
inspecting the at least one sample of material for exposure to hydrogen sulfide; and
estimating the hydrogen sulfide content of the reservoir fluid based upon the inspection
of the optical reaction of the at least one sample of material and the temperature
readings of the reservoir fluid.
7. (Previously Presented) The method of claim 1, wherein the at least one sample of
material is selected from a group comprising chromium, nickel and steel alloys.
8. (Previously Presented) The method of claim 1, further comprising:
detecting an optical reaction of the at least one sample of material with a sensor.
9. (Previously Presented) The method of claim 8, further comprising:
transmitting a signal indicating an optical reaction of the at least one sample of material.
10. (Previously Presented) A method for identifying the presence of hydrogen sulfide in a
subsurface formation penetrated by a wellbore, comprising:
lowering a formation evaluation tool into the wellbore, the tool comprising a housing, at
least one sample of material with a surface that is optically reactive to the
presence of hydrogen sulfide, and at least one passage for conducting formation
fluid to the sample of material;
delivering formation fluid to the sample of material via the passage;
retrieving the formation evaluation tool from the wellbore; and
inspecting the sample of material for an optical reaction.
11. (Previously Presented) The method of claim 10, wherein the at least one sample of
material is selected from a group comprising chromium, nickel and steel alloys.

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12. (Currently Amended) The method of claim 10, wherein the tool comprises a plurality of samples of material ~~optically reactive coupons~~, the ~~coupons~~ samples of material capable of different optical reactions in response to varying hydrogen sulfide concentrations.
13. (Previously Presented) The method of claim 10, further comprising:
 - taking temperature readings of the formation fluid;
 - inspecting the optical reaction of the at least one sample of material to determine if hydrogen sulfide is present; and
 - estimating the hydrogen sulfide content of the fluid utilizing the optical reaction on the surface of the at least one sample of material and the temperature readings of the formation fluid.
14. (Previously Presented) The method of claim 10, further comprising:
 - transporting formation fluid through the formation evaluation tool; and
 - collecting formation fluid samples within the formation evaluation tool.
15. (Previously Presented) A method for identifying the presence of hydrogen sulfide in a subsurface formations penetrated by a wellbore, comprising the steps of:
 - lowering a formation evaluation tool into the wellbore, the tool including a housing having at least one sample of material that is reactive to the presence of hydrogen sulfide and a passage for conducting formation fluid to the sample of material;
 - delivering formation fluid to the sample of material via the passages;
 - retrieving the formation evaluation tool from the wellbore; and
 - inspecting the sample of material for an optical reaction.
16. (Original) The method of claim 15, wherein the sample of material is a metal.
17. (Previously Presented) The method of claim 16, wherein the metal is selected from a group comprising copper and nickel alloys.

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18. (Original) The method of claim 15 wherein the sample of material reacts to hydrogen sulfide by changing color.
19. (Previously Presented) A method of reservoir analysis, comprising:
 - lowering a formation evaluation tool into a wellbore that penetrates a reservoir, the formation evaluation tool comprising at least one sample of material that is optically reactive to the presence of hydrogen sulfide;
 - flowing formation fluid through the formation evaluation tool;
 - exposing the at least one sample of material to formation fluid upon the formation fluid entry into the wellbore;
 - taking temperature readings of the formation fluid;
 - collecting formation fluid samples within the formation evaluation tool;
 - retrieving the formation evaluation tool from the wellbore;
 - inspecting the at least one sample of material for an optical reaction; and
 - estimating the hydrogen sulfide content of the formation fluid within the reservoir utilizing the inspection of the optical reaction of the at least one sample of material and the temperature readings of the formation fluid.
20. (Previously Presented) A formation evaluation tool, comprising:
 - a housing; and
 - at least one sample of material operatively connected to the housing, the at least one sample of material being optically reactive to the presence of hydrogen sulfide positioned in the housing;wherein the at least one sample of material is adapted to be exposed to reservoir fluid upon the reservoir fluid entry into the apparatus.
21. (Previously Presented) The formation evaluation tool of claim 20, wherein the sample of material is a metal.

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22. (Previously Presented) The formation evaluation tool of claim 21, wherein the metal is selected from a group comprising chromium, nickel and steel alloys.
23. (Previously Presented) The formation evaluation tool of claim 20, wherein the sample of material reacts to hydrogen sulfide by changing color.
24. (Previously Presented) The formation evaluation tool of claim 20, further comprising a temperature sensor.
25. (Previously Presented) The formation evaluation tool of claim 20, further comprising a pressure sensor.
26. (Previously Presented) The formation evaluation tool of claim 20, wherein the at least one sample of material comprise removable coupons.
27. (Previously Presented) The formation evaluation tool of claim 20, wherein the at least one sample of material comprises removable coupons having different reactive responses to hydrogen sulfide.
28. (Previously Presented) The formation evaluation tool of claim 20, wherein the housing further comprises a coupon holder that is resistant to hydrogen sulfide, the housing capable of retaining the at least one sample of material.
29. (Previously Presented) The formation evaluation tool of claim 20, wherein the apparatus comprises at least three hydrogen sulfide detection coupons.
30. (Previously Presented) The formation evaluation tool of claim 20, wherein the apparatus further comprises a sensor capable of detecting a an optical reaction in the at least one sample of material.
31. (Previously Presented) The formation evaluation tool of claim 30, wherein the sensor is capable of transmitting a signal indicating an optical reaction in the at least one sample of material.

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32. (Previously Presented) A formation evaluation tool, comprising:
- a plurality of coupons that are optically reactive to the presence of hydrogen sulfide;
 - a housing capable of retaining the coupons and having a passage for communicating formation fluids between a wellbore and the coupons;
 - a temperature sensor;
 - a probe capable of flowing formation fluids into the formation evaluation tool;
- wherein when the formation fluids are pumped through the formation evaluation tool the coupons are exposed to the formation fluid upon the formation fluid entry into the formation evaluation tool; and
- wherein the surface of the plurality of coupons are capable of changing color upon contact with hydrogen sulfide and can be interpreted to determine the hydrogen sulfide content in the formation fluids.
33. (Previously Presented) The formation evaluation tool of claim 32, wherein the formation evaluation tool further comprises a sensor capable of detecting an optically reaction in the at least one sample of material as a result of detecting hydrogen sulfide.
34. (Previously Presented) The formation evaluation tool of claim 33, wherein the sensor is capable of transmitting a signal indicating an optically reaction in the at least one sample of material as a result of detecting hydrogen sulfide.
35. (Previously Presented) An apparatus for identifying the presence of hydrogen sulfide in a wellbore penetrating a subsurface formation, comprising:
- a formation evaluation tool including a housing having at least one sample of material that is reactive to the presence of hydrogen sulfide, the housing having a passage for conducting formation fluid to the sample of material when the formation evaluation tool is lowered into the wellbore.
36. (Original) The apparatus of claim 35, wherein the sample of material is a metal.

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37. (Previously Presented) The apparatus of claim 36, wherein the metal is selected from a group comprising copper and nickel alloys.
38. (Original) The apparatus of claim 35 wherein the sample of material reacts to hydrogen sulfide by changing color.